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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,311	02/23/2004	Ronald J. Kerans	AFD552	2162

26902 7590 10/12/2006

DEPARTMENT OF THE AIR FORCE  
AFMC LO/JAZ  
2240 B ST., RM. 100  
WRIGHT-PATTERSON AFB, OH 45433-7109

EXAMINER
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SAVAGE, JASON L

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 10/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/784,311

Applicant(s)

KERANS ET AL.

Examiner

Jason L. Savage

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection on 8-4-06. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6-16-06 has been entered.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 4-6, the limitation that "wherein said metal content comprises material selected for thermal conductivity" is indefinite. It is unclear if Applicant intends to select the metal based on the thermal conductivities of different metals or if Applicant intends to use metal since metal generally has an increased thermal conductivity in comparison to ceramic materials employed by the prior art. For the purposes of Examination, the claim limitation has been interpreted as meaning "wherein said metal is thermally conductive".

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In claims 7-9, the limitation that "wherein said metal content comprises material selected for load bearing capacity" is indefinite. It is unclear if Applicant intends to select the metal based on the load bearing capacity of different metals or if Applicant intends to use metal since metal generally has an increased load bearing capacity in comparison to ceramic materials employed by the prior art. For the purposes of Examination, the claim limitation has been interpreted as meaning "wherein said metal is augments the load-bearing capacity of the composite".

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parthasarathy et al. (US 6,251,815) in view of Yang (US 5,549,151).

Parthasarathy teaches a thermal gradient resistant composite material containing fiber-reinforcements embedded in a matrix material having a hot side and a cool side (col. 2, ln. 6-35). Parthasarathy further teaches that the fiber reinforcement is graded by coefficient of thermal expansion (CTE) from the hot side to the cool by placing fibers having a higher CTE in one region and fibers having a lower CTE in the other (col. 2, ln. 6-35). Parthasarathy teaches that the preferred matrix materials are ceramics (col. 2,

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ln. 56-67), however it is silent to the thermal resistant composite material being a metal-ceramic composite.

Yang teaches that composite bodies exhibiting graded material properties such as graded thermal expansion coefficients can be formed by carefully selecting the materials used to form the composite (col. 14, ln. 10-24). Yang also teaches that a functionally graded composite material comprising a metal rich region and a ceramic rich region with a graded ceramic-metal zone there between provides desirable graded thermal expansion properties (col. 14, ln. 10-24).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the composite of Parthasarathy by substituting metal as the matrix material such as disclosed by Yang to form a graded composite with a reasonable expectation of success. One would have been motivated to make such a modification in order to further enhance the thermal gradient resistance of the fiber reinforced composite. Absent a teaching of the criticality or showing of unexpected results, the claimed composite would not provide a patentable distinction over the product of Parthasarathy as modified by Yang.

It is well settled that the test of obviousness is not whether the features of one reference can be bodily incorporated into the structure of another and proper inquiry should not be limited to the specific structure shown by the references, but should be into the concepts fairly contained therein, and the overriding question to be determined is whether those concepts would suggest to one of ordinary skill in the art the modifications called for by the claims, *In re Van Beckum*, 169 USPQ 47 (CCPA 1971),

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In re Bozek, 163 USPQ 545 (CCPA 1969); In re Richman, 165 USPQ 509 (CCPA 1970); In re Henley, 112 USPQ 56 (CCPA 1956); In re Sneed, 218 USPQ 385 (Fed. Cir. 1983).

In response to the issue whether the reference is nonanalogous art, it has been held that the determination that a reference is from a nonanalogous art is twofold. First, one decides if the reference is within the field of the inventor's endeavor. If it is not, one proceeds to determine whether the reference is reasonably pertinent to the particular problem with which the inventor was involved, In re Wood, 202 USPQ 171, 174. In the instant case, both Parthasarathy and Yang are generally drawn to composites exhibiting graded thermal expansion properties.

Regarding the limitation that the fiber in the hot region has a lower CTE than the fiber in the cool region in claim 2 and the fiber in the hot region has a higher CTE than the fiber in the cool region in claim 3, Parthasarathy teaches that fibers having a higher CTE should be used in the hot region when part is used at a temperature below a minimum-stress temperature (MST) and lower CTE fibers in the hot region when the part is used at a temperature above the MST (col. 4, ln. 24-51).

### ***Allowable Subject Matter***

Claims 4-9 contain allowable subject matter and would be allowable over the prior art if the cited 112 rejections above are resolved.

The following is a statement of reasons for the indication of allowable subject matter: While Parthasarathy and Yang are generally drawn to composites exhibiting

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graded thermal expansion properties, Yang would not reasonably suggest to one of ordinary skill in the art that the substitution of metal as a matrix material in the thermally graded composite of Parthasarthy would still withstand a temperature differential of 100°C or greater as recited in the claims.

### ***Response to Arguments***

Applicant's arguments filed 6-16-06 have been fully considered but they are not persuasive.

Applicant argues that the Examiner has failed to point out a motivation or suggestion in the prior art that would lead one to make such a further modification to the combination of Pathasarathy and Yang in order to realize the claimed invention. Applicant asserts that such a suggestion or motivation does not exist insofar as the cited references were not addressing the unique problems of high differential temperature applications. It is noted that this argument is not commensurate in scope with claims 1-3; however with respect to claims 4-9, the argument was found to be persuasive for the reasoning set forth in the reasoning for indicating allowable subject matter above. With respect to claims 1-3, the references are considered to both generally be drawn to composites exhibiting graded thermal expansion properties. As such, it would have been obvious to incorporate the concepts fairly contained therein such as was recited in the rejections above.

With respect to claims 4 and 7, the newly added limitations drawn to the metal content being selected for thermal conductivity and load bearing capacity respectively

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are considered indefinite for the reasoning set forth in the rejections above. The claim rejections would be resolved if Applicant were to remove the limitations which have been found to be indefinite.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jason Savage  
10-2-06



JENNIFER C. MCNEIL  
SUPERVISORY PATENT EXAMINER

10/2/06